IN THE CLAIMS:

The attached listing of claims will replace all prior claims in the application:

LISTING OF CLAIMS

Claim 1. (Currently Amended) ~~Method for~~ A method of measuring process parameters of a material working process using a high energy beam (2), in particular a laser beam, focused onto a working zone of a workpiece (8) by measuring with ~~the aid of~~ an optical sensor (10) the light intensity emitted from the workpiece substantially coaxially to ~~the~~ high energy radiation ~~in~~ directed toward the working zone in the area of vapour capillaries (14) produced by the high energy beam (2), the optical sensor (10) sensing a picture field and transmitting the measuring signals to an evaluation means (18),

wherein ~~an~~ the optical sensor (10) ~~having~~ has a dynamic range of more than 70 db ~~is used~~, and

measuring signals of sections of ~~the~~ (a) an image field showing the area of the vapour capillaries (14) and (b) at least ~~the~~ an area of ~~the~~ a melting zone (20) surrounding the vapour capillaries (14) are simultaneously transmitted to the evaluation means (18).

Claim 2. (Original) Method according to claim 1 wherein in the picture field sensed by the optical sensor (10) different picture sections (24 to 29) are freely selectable and exclusively the measuring signals of these picture sections are used for simultaneous determination of different process parameters to be monitored.

Claim 3. (Original) Method according to claim 2 wherein the measuring signals of picture sections (27) showing the area of the melting zone (20) in front of or at the side of the vapour capillaries (14) are used for detecting defects occurring during weld preparation.

Claim 4. (Original) Method according to claim 2 wherein the measuring signals of a picture section (23) showing the melting zone (20) upstream of the working zone, as seen in the working direction, or the border area upstream of the melting zone (20) are used for measuring the weld location and for controlling the laser position or the workpiece position.

Claim 5. (Currently Amended) Method according to claim 1 wherein the penetration depth of the high energy beam (2) is determined on the basis of a reduced number of [pixles] pixels of a picture section (28) showing the center of the vapour capillaries (14).

Claim 6. (Currently Amended) Method according to claim 2 wherein the measuring signals of one of (a) a picture section (30) taken in the melting zone (20) downstream of the vapour capillaries (14), as seen in ~~the~~ a working direction, ~~and/or~~ and (b) downstream of the melting zone (20), as seen in the working direction, are used for measuring the surface topography of the workpiece (8) ~~to be~~ subjected to the working process.

Claim 7. (Currently Amended). Method according to claim 2 wherein ~~the~~ measuring data of the different picture sections (23 to 30) are subjected to data reduction.

Claim 8. (Original) Method according to claim 1 wherein light of certain wavelengths in the beam path to the optical sensor (10) is filtered.

Claim 9. (Original) Method according to claim 1 wherein a CMOS camera is used as optical sensor (10).

Claim 10. (Original) Method according to claim 1 wherein by measuring the light intensity in the vapour capillaries (14) capillary parameters and by measuring the light intensity at at least one selected place of the melting zone (20) molten pool parameters are simultaneously determined, with control of the working process being carried out as a function of the determined capillary parameters and the determined molten pool parameters.

Claim 11. (Currently Amended) Method according to claim 1, wherein ~~an~~ the optical sensor (10) ~~having~~ has a dynamic range of more than 100 dB ~~is used~~.

Claim 12. (Original) Method according to claim 1 wherein the focal position of the high energy beam (2) is determined by measuring the changes in light intensity in a linear or rectangular picture section (29) extending through the vapour capillaries (14) and the neighboring melting zones (20).

Claim 13. (Currently Amended) Method according to claim 1 wherein the measuring signals of selected ~~pixles~~ pixels are used for monitoring or process control purposes.

Claim 14. (Currently Amended) ~~Device~~ A device for measuring process parameters of a material working process comprising ~~a~~ means for producing a high energy beam (2), ~~e.g. a laser beam, a~~ focusing means (6) for focusing the high energy beam (2) onto a working zone of a workpiece (8), ~~and~~ an optical sensor (10) for measuring ~~the~~ emitted light intensity of the vapour capillaries (14) produced in the working zone, the sensor (10) being focused coaxially to the direction of the high energy beam (2) onto the working zone of the workpiece (8), ~~and an~~ evaluation means (18) for evaluating the measuring signals of the scanned picture field supplied by the optical sensor (10),

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~~wherein~~ and the optical sensor (10) ~~has~~ having a dynamic range of more than 70 dB ~~and transmits~~ for simultaneously transmitting to the evaluation means (18) measuring signals ~~from the~~ of sections of (a) an image field showing an area of the vapour capillaries (14) and (b) at least an area of the melting zone (20) surrounding the vapour capillaries (14).

Claim 15. (Original) Device according to claim 14 wherein the evaluation means (18) receives only measuring signals of picture sections of the picture field covering, in addition to the area of the vapour capillaries (14), at least an area of the melting zone (20) surrounding the vapour capillaries (14).

Claim 16. (Original) Device according to claim 14 wherein the optical sensor (10) is a CMOS camera.

Claim 17. (Original) Device according to claim 14 wherein the evaluation means (18) evaluates the picture signals of a plurality of different picture sections (24 to 30) of the picture field scanned by the sensor (10) with regard to predetermined process parameters.

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Claim 18. (Currently Amended) Device according to claim 14 wherein near the vapour capillaries (14) the evaluation means (18) senses, for the purpose of measuring the penetration depth of the high energy beam (2), a predetermined reduced number of [pixles] pixels showing the area of the high energy beam (2).

Claim 19. (Original) Device according to claim 17 wherein the evaluation means (18) evaluates the measuring signals of picture sections (24, 27) showing the area of the melting zone (20) downstream of and at the side of the vapour capillaries (14), as seen in the working direction, for the purpose of detecting defects occurring during weld preparation.

Claim 20. (Original) Device according to claim 17 wherein the evaluation means (18) evaluates the measuring signals of picture sections taken in the melting zone (20) downstream of the vapour capillaries (14), as seen in the working direction, or downstream of the melting zone (20), as seen in the working direction, for the purpose of measuring the surface topography.

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Claim 21. (Original) Device according to claim 17 wherein the evaluation means (18) evaluates the measuring signals of a picture section (29) extending linearly or rectangularly through the vapour capillaries (14) and the neighboring melting zone (20) for determining the focal position of the high energy beam (2).

Claim 22. (Original) Device according to claim 14 wherein a filter (15) is arranged in the beam path to the optical sensor (10) by means of which filter (15) specific wavelengths of the light received can be blocked.